

## Naturally Acquired Rabies in an Eastern Chipmunk (*Tamias striatus*)

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Rabies in an Eastern chipmunk was detected by fluorescent-antibody testing and mouse inoculation. The results were independently confirmed, and the virus was recovered from tissue culture.

Each year a few cases of rabies in rodents are reported to the Centers for Disease Control (CDC) (9). From 1979 to 1982, there were 26 such instances involving several species of rodents (W. Winkler, personal communication). Despite the number of cases that have been identified, relatively few have been reported in the scientific literature. Independently confirmed and published cases of rabies in rodents during the last 5 years have involved squirrels, a mouse, and an eastern wood rat (1, 3, 4, 6). Another case of rabies in a rat found in Texas has been confirmed (Jean Smith, personal communication; manuscript submitted for publication). The number of rodents with rabies appear to be small when compared with the incidence of the disease in other species. However, it is the policy of some laboratories performing rabies testing to decline to test heads of rodents submitted for examination, based on the misconception that human beings do not risk contracting rabies from bites by this group of animals. From the information currently in the literature, this would appear not to be the case, and studies (2, 10) have demonstrated that rabies virus is present in the salivary glands of experimentally infected rodents. Thus, bites from wild rodents may be potentially hazardous. The purpose of this paper is to report an independently confirmed case of rabies in an Eastern chipmunk (*Tamias striatus*). A review of the literature indicates that this may be the first such independently confirmed and published occurrence of rabies in this species.

The chipmunk was discovered by a child after the animal had been captured by the family dog and brought into the yard of a residence located in a rural area of Union County, S.C. The behavior of the chipmunk before it was captured by the dog is unknown, but it is rather unusual for a healthy rodent to be caught by a dog. Thinking the chipmunk was dead, a 5-year-old male picked it up and was bitten on the finger. The animal was killed and submitted to the Bureau of Laboratories, South Carolina Department of Health and Environmental Control, Columbia, for rabies examination. In this laboratory the brains of feral rodents involved in bites of human beings are routinely accepted for rabies testing.

The brain was removed and smears were prepared, to the extent permitted by the size of the brain, from the Ammon's horn, cerebrum, and cerebellum of the chipmunk. These smears were tested by the fluorescent-antibody procedure (7). Fluorescein isothiocyanate-conjugated anti-rabies globulin was obtained from BBL Microbiology Systems (lot G3GDBY) and from the CDC (lot 80-0125). The BBL conjugate was absorbed with normal and rabid mouse brain prepared in our laboratories, and the CDC conjugate was absorbed with normal and rabid mouse brain prepared at the

CDC (lot 81-0144K). Smears were initially stained with absorbed BBL conjugate. Examination of the stained smears revealed numerous typically stained (4+ intensity) inclusions in the slide prepared from the cerebellum and occasional typical inclusions in the slides prepared from the Ammon's horn and cerebrum. When these results were obtained, new smears were prepared from appropriate areas of the brain and stained with absorbed CDC conjugate. Similar results were observed. In both systems, smears of brain material known to be positive or negative for rabies virus gave appropriate reactions. Smears of the chipmunk brain stained with rabid mouse brain-absorbed globulin gave no evidence of false-positive reaction.

Since these findings represented only the second instance in which a rodent was fluorescent-antibody-positive in our laboratory, 14 suckling mice (Swiss albino, random bred) were each injected intracranially with 0.03 ml of a 10% suspension of chipmunk brain and observed daily for death or evidence of illness. To reduce the possibility of an accidental misidentification of the specimen, no other suspensions were prepared concurrently with that of the chipmunk. Two mice died within 48 h of injection and were discarded without further testing. An additional two mice died during the course of the experiment but could not be tested because they were eaten by their cage mates. Nineteen days after the inoculation, the majority of animals demonstrated hind leg paralysis and tremor. On day 21, six animals were found dead, and on day 22, the remaining four died. Examination of fluorescent-antibody-stained slides prepared from the brains of two of the mice revealed numerous typically stained (4+ intensity) inclusions per smear. Appropriate controls gave expected results.

A small portion of the chipmunk brain and smears from the Ammon's horn and cerebellar areas were submitted to the Rabies Laboratory at the New York State Department of Health, Albany, for confirmation. At that institution, fluorescent-antibody procedures revealed a few typically stained inclusions in the smears of cerebellum and no evidence of rabies in smears from the Ammon's horn. In addition to the fluorescent-antibody procedure, neuroblastoma C-1300 cells were inoculated with a suspension of the chipmunk brain. After appropriate incubation, rabies virus was recovered and identified from this tissue culture.

A brain from one of the mice inoculated with brain suspension from the infected chipmunk was submitted to the CDC for monoclonal antibody typing of the virus. The results indicated that the virus was a strain often associated with raccoons. Rabies in bats and domestic animals has been encountered in the area where the chipmunk was found, but no cases in raccoons had been documented within 100 km. However, South Carolina has experienced a serious problem with rabies in raccoons, and it is possible that rabid raccoons

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exist in the area from which the chipmunk was submitted (5, 8).

On the basis of the number of reports to the CDC, it does not appear likely that rodents represent a major reservoir of rabies in the United States. However, with the paucity of reports in the literature on this subject and with some laboratories declining to test rodents for rabies, it is difficult to clearly define the extent of the problem. It is, therefore, important that laboratories diagnosing rabies in unusual animal species have the results confirmed independently and report these cases in the literature.

The child who was bitten received post exposure prophylaxis with human diploid cell vaccine and human rabies immunoglobulin. He tolerated the treatment well and is free of evidence of rabies at this time.

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